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**INPUT DOCUMENT****Source:** Alex Nikolov, Comms Solutions & Clive Menzies, MacroRisk Connect**Title:** NFT, AI as contemporary technology tool for human sustainability and role of CBDC as bridge.

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**Keywords:** NFT, AI, CBDC**Abstract:** The document contains a contribution for presentation to the three main working groups.

## The Money Paradox

### Abstract

*An agnostic examination of how humans sustain themselves both before and after starting to adopt various forms of money as one of the tools to organise themselves. While the appearance of money some three to five thousand years ago facilitated human activities at scale over large distances, money tampers with humans' **natural** ability to acquire essential knowledge and wisdom that sustained us for some 300,000 years – **protosustainability**; this methodology is what we use in our families and small groups today and is a blueprint for the contemporary, data driven economies. Tools to facilitate human activity at scale have emerged in recent decades and these tools are embedded in our daily lives and shape the environment of the **current structural** change.*

*The use of opensource and co-creative methodologies help us to see the current reality and its potential for changes in tools such as money and ways/methodologies to organise ourselves.*

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## The Money Paradox

Today, *many* actively resist the introduction of central bank digital currencies (CBDCs) only because they make explicit what money does. Whereas very *few* explore the shortcomings of current money methodology to find alternative ways to sustain ourselves. This is the paradox.

## Human Sustainability

In order to be able to foresee the future of human organisation, it is necessary to explore the past to understand how we got to where we are today.

Money exists today in its current form because we needed tools and resulting methods to organise and sustain ourselves in an expanded environment.

We have needs, desires, capacities, skills, knowledge, and wisdom. To satisfy our needs and expand our capacity and knowledge, we need to work/live in groups and communities such that each can optimise their own situation by interacting with others, sharing what we need and learn while, in turn, we benefit from what others provide. Circumstantial evidence from the past and direct experience today suggests that for most of the time humans have existed and thrived as a species, we cooperated in this way.

The adoption of money, to scale our activities over time and expanded distance, relatively recently, has created a competitive environment accompanied by unintended consequences such that we now face an existential crisis as a species.

In the last 50-60 years, tools and understanding have emerged from all the technological progress to date that can extend our native protosustainability methodology to sustain ourselves in the contemporary environment.

## Protosustainability

**Proto-** *a combining form meaning “first,” “foremost,” “earliest form of,” used in the formation of compound words (protomartyr; protolithic; protoplasm).*

We became successful as a species because we evolved handling symbols through language and other means. The evolution of language and symbology allowed humans to sustain themselves by exchanging information and communicating skills and resources – in this paper, we call this direct value handling<sup>i</sup>. These tools (language and symbology) facilitate the capture, storage and transfer of knowledge and wisdom in space and time.

Each individual handled complex knowledge, (data) related to the needs, capacities and wisdom of their families and communities. The consequent accumulation, retention and dissemination of information about elements of reality relating to individuals, families and communities resulted in the success of modern humans.

This methodology is what we use in our families and small groups (FSG) today and is a blueprint for the contemporary, data driven economies.

**Cooperation** is the essential feature of human sustainability that is fostered by this methodology.

The challenge to this proven methodology arose when people spread beyond the “village” such that the sustainability requirements of those that spread were unknown. Tools to capture, store and transfer in space and time, unique attributes beyond the boundaries of the community were not available. **Note:** *The fax machine didn't become widely available until the mid-1980s and the first permanent phone line on which fax communication depended only became available in England in 1877.*

## Emergence of money and its methodologies

During the last three to five thousand years, various forms of money and debt have been tried in order to scale human sustainability over time and distance. Money took the form of tokens or commodities with accepted or imposed representations of value. Different ways of issuing and handling tokens were tried, leading to different forms of money. Examples include shells, tobacco and coins. As communities spread, some means, such as Rai Stones<sup>ii</sup>, to capture, store and transfer knowledge, over expanded space and time, for human sustainability, were used.

The adoption of the current (fungible) money methodology was possibly one of many attempts to expand the FSG methodology. Examples of money or ledgers include non-fungible Rai Stones. Tally Sticks<sup>iii</sup> are another example of non-fungible money but they were often used as a form of exchangeable money.

*fungible* (mid 17th century) - from medieval Latin *fungibilis*,

*fungi* - ‘perform, enjoy’

*fungi vice* - ‘serve in place of’

*non-fungible* – unique, i.e. incapable of substitution, e.g. a non-fungible token (NFT) is used to represent unique attributes

Fungible money as a glorified system of barter emerged; tokens (money or “receipts”) were maybe issued by those in “authority” as a record of individual contributions; these tokens were then traded and circulated.

In the absence of the means to capture, store and share unique attributes over time, distance and at scale, humans were deprived of a means to understand the sustainability requirements beyond their immediate community. There was no means to share and maintain relevance of (i.e. to update) the unique attributes of our expanded environment with others.

Fungible money deprived us of the unique information about the elements required to sustain ourselves in an inclusive way.

Centralised issuance and control of money facilitated control of those who participated in the use of money and made us fully dependant on money for our existence. Becoming a single point of failure for humanity.

“Let me issue and control a nation’s money and I care not who writes the laws.” — Meyer Amschel Rothschild

Two types of money evolved:

- money which arises (issued) as part of a process - i.e. *endogenous*

- once issued and exchanged the money is external to subsequent processes - i.e. *exogenous*

Evidence shows that money benefits those to whom it is endogenous and becomes a controlling mechanism while creating other disadvantages for those to whom money is exogenous.

The process by which money is created is embedded in the banking system, for example. Banking is the process by which money is created – by both central and commercial banks; for banks money is endogenous. Crypto currencies, such as Bitcoin are endogenous to those who “mine” them to maintain the blockchain.

To everyone else, money is *exogenous*, i.e. we have to obtain money from an external source – the banking system or by exchanging bank created money for crypto-currencies.

Alternatively, we exchange our creative energy and resources for tokens issued by banks or mined by the crypto-currency community to satisfy our needs and desires.

Endogenous, exogenous, fungible and non-fungible are core elements of money methodologies; how they are combined defines whether they directly handle value or are merely a proxies thereof.

The Guernsey experiment<sup>iv</sup> describes how a scarcity of exogenous money resulted in the cessation of human development and threatened the very existence of the island’s inhabitants. The realisation of the opportunity to create endogenous money facilitated the speedy revival of the island’s economy and infrastructure. Money was created and spent into the economy to repair the roads and sea walls and to build a market. Once in circulation, the money became exogenous.

Similarly, two centuries later, non-fungible tokens (NFTs) with their endogenous qualities, have created new opportunities for artists, creators, and collectors to engage in the digital economy valued at some \$21billion in 2022. NFTs become a form of exogenous money when traded.

Attempting to value everything via money focuses us on the exchange aspect/value of money over the use value (what is necessary for human sustainability) and creates perceptions of reality which lack the unique representations of actual reality and obscures how everything is interconnected. Choosing a cup of espresso based on its monetary value, for example, will not necessarily result in the best coffee experience (use value). In Italy, a coffee will cost c. £0.78 while in UAE you will pay the equivalent of £4.47. Yet, it is claimed by some that the best cup of coffee is obtained in Milan... Recently, a flat white coffee in a certain Mayfair coffee shop bought with a phone “tap” resulted in the princely sum of £8:45 being debited! And it didn’t come with “extras” ...

The value of everything is determined by money, irrespective that this “price” value bears little relationship to the human values, knowledge and wisdom that sustained us for most of our species’ existence. Needs or desires can only be satisfied if they pass the threshold monetary value necessary to qualify for funding/investment.

Our technical inability to directly handle value over time and distance at scale, resulted in money becoming the fungible proxy for value. Thus, money itself becomes the target of our desire – we seek to acquire as much money as we can.

**Competition** is an inevitable consequence of exchange money methodology<sup>v</sup>. Empirical evidence shows that, for the last 60 years, using money as the means to organise ourselves, has resulted in mindless competition and, in the rise and fall of companies and countries and the social consequences that follow such cycles.

## Contemporary money

The money and debt paradigm evolved over some 5,000 years, took shape during the last three centuries and, arguably, contemporary money emerged, and became ubiquitous globally following WW2. The Bretton Woods agreement in 1944.<sup>vi</sup> referenced currencies to the US dollar, the global reserve currency which in turn was underpinned by gold. The gold standard<sup>vii</sup> was abandoned in 1971, leading to the global fiat money system of today.

Modern humans have existed for some 300,000 years. There is evidence of some use of debt and exchange money for the last 5000 years. Since then, the concept of economics arose through the use of money as the primary method to organise human activity. Economic cycles always end with an accumulation of excessive debt, requiring a reset of the money base and debt forgiveness, typically through debt Jubilee<sup>viii</sup>. This is a structural phenomenon, not due to failures or weakness among individuals, groups or nations but an integral feature of exchange money methodology.

There has been no reset or general debt forgiveness for nearly a century. One can argue that the second world war and the introduction of special drawing rights (SDRs) in 1969<sup>ix</sup> were system resets of sorts. War benefits very few and SDRs didn't grant debt forgiveness to the wider population but increased their financial stress.

The Greenspan “put”<sup>x</sup> in response to stock market crashes in October 1987 deferred the essential reset or Jubilee into the future. Since then, the major central banks have met every financial crisis with an expansion of the money supply. Since the global financial crisis of 2008, we've seen unprecedented money expansion, particularly of US Dollars, Euros and UK Pounds. This has delayed the inevitable but sooner or later, a reset will be forced or chosen.

Digital payments have been expanding over the last two decades but more recently cash payments have been making a comeback, not least in reaction to the growing awareness of ambitions to introduce central bank digital currencies (CBDCs). Cash is no protection against the inadequacies of exchange money methodology. All of the alleged disadvantages of prospective CBDCs are manifest within the current digital money environment; for example, individuals who express views or disclose information that threatens to reveal the reality of our condition are “de-banked”<sup>xi</sup>, i.e. denied access to the means to sustain themselves.

## Tools and Methods

**Systems Thinking:** Applying systems thinking to understand the interconnectedness of environmental, social, and economic factors in sustainability challenges.

The industrial revolution lasted from around 1750 to 1950 (200 years) during which time human productivity multiplied by magnitudes of hundreds.

In the last 5 decades, through technical advances, the ability to process and analyse data has increased by the order of millions. This has led to transfer, of the ability to capture, store and share information and derive knowledge, from select individuals to the masses.

The world we see today took shape between 1960 and 2000 when transistors were superseded by printed integrated circuitry which became increasingly miniaturised and sophisticated leading to a massive reduction in cost combined with an exponential growth in capacity and speed.

The Hypertext Transfer Protocol (HTTP)<sup>xii</sup> is an application-level protocol with the lightness and speed necessary for distributed, collaborative, hypermedia information systems. HTTP has been in use by the World-Wide Web global information initiative since 1990. Opensource methodology emerged in the late 1970s. Without the HTTP tool, opensource methodology wouldn't have dominated the information and communication technology landscape.

The first commercial appearance of NFTs was claimed to be in 2014 with the representation of digital artwork, Quantum, by Kevin McCoy. A Non-Fungible Token (NFT) is a digital representation of unique attributes of a particular item or piece of content using blockchain technology. This technology provides for verifying authenticity, ownership and data provenance.

In the field of artificial intelligence (AI) and machine learning (ML), knowing the source and quality of training data is critical. NFTs can provide a transparent and auditable record of data provenance, enhancing the trustworthiness of AI and ML models.

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines or computer systems to be able to help humans analyse huge amounts of data and discover and handle links. A key component and technique associated with AI is **Machine Learning (ML)**: A subset of AI that involves training algorithms to recognize patterns and make predictions or decisions based on data.

The purpose of A.I. is to aid/augment real human intelligence.

A.I. is an ideal candidate to enable us to calculate and model the human sustainability field (requirements).

These technical developments have been accompanied by the evolution of the cooperative, *opensource*<sup>xiii</sup> or co-creative methodology<sup>xiv</sup> which has created ubiquitous information and communication tools that have been integrated into and dominate the technology we use today.

In combination, contemporary technology and opensource methodologies have led to attempts to improve the way we organise ourselves by fixing the tool (money) by which we sustain ourselves. We are seeing structural changes evolving towards **Distributed Autonomous, Inter-dependent Self-Organisation** – *protosustainability*.

## The Value Perspective in Time

How will this ongoing change affect those who hold and manage investment assets today, the monetary value of which is difficult to quantify but runs into tens or hundreds of \$trillions? It is also difficult to quantify how much of this current asset pool is managed and what proportion is unmanaged.

Investment giants such as BlackRock and Vanguard are managing a significant proportion of these assets on behalf of insurance companies, pensions funds, other investment managers or aggregators of investment funds including family offices, financial intermediaries, charities and funds of funds. There are also retail investors who will buy investment funds directly. Publicly traded assets, stocks, shares, etc. are visible whereas a large proportion of assets aren't widely visible; they are held directly by private companies, individuals, foundations, trusts etc.

We also need to differentiate between money, a proxy for real value, and value itself.

Arguably, real value is in the commons: land, resources, knowledge etc. These are either gifts from nature (the universe) or co-created by humans through collaboration over time and space. Intellectual property rights are a mechanism to appropriate value that rightfully belongs to us all because no one individual or group of individuals created the totality over which ownership is claimed. The FSG methodology that sustained humans for most of the last 300,000 years relies on equitably sharing the value of the commons.

When value is expressed through the money paradigm, it is impossible to see how equitable sharing can be accomplished in spite of initiatives such as the Embankment Project for Inclusive Capitalism (EPIC)<sup>xv</sup> in which BlackRock and Vanguard are participants.

*The Coalition for Inclusive Capitalism<sup>xvi</sup> and EY brought together more than 30 global business leaders, including asset owners, managers, and companies representing almost \$30 trillion of assets under management (AUM), to develop a standardized, material, and comparable set of metrics for the measurement of activities that create long-term value and that affect a broad range of stakeholders including customers, employees, suppliers, communities, and shareholders.*

The EPIC working groups looked at how to expand ways to capture value in 2019

*“The changing shape of business value: As we gain the ability to measure unprecedented aspects of a business’s performance, it is also important to focus on what we measure. That requires us to recognize that the shape of business value has changed considerably in the last several decades. For most of the previous century, the value of a business was determined in large part by its tangible assets. In a manufacturing-based economy, the logic of this approach was evident: property, plant, and machinery were indeed critical components*



*required for success. In the digital era, however, manufacturing no longer provides the growth opportunities...”*

In contrast, the likes of Facebook, Amazon and Google (FAG) are ahead of the game and are highly valued accordingly as publicly quoted companies. They tap into our/everyone’s data to make informed decisions and derive value, indirectly, from opensource software and self-organising, co-creative development methodologies emanating from individuals, groups and companies that are embracing what the new paradigm has to offer. These entities provide us with empirical evidence of the benefits of direct value handling. FAG grew and are highly valued not because of money invested but from the knowledge economy on which they thrive. They handle value directly, the data (reality and value) is the endogenous “money”. For the rest of us, this value is exogenous, and we need to use exogenous money to interact with them.

*Today, the world is producing unprecedented amounts of data. In fact, 90% of all the data on Earth has been generated in the last two years alone – and we are currently producing another 2.5 quintillion bytes of data per day.<sup>7</sup> For companies with strong data and analytics capabilities, this represents a significant opportunity to gain a competitive advantage. That is because it has enhanced their ability to manage risk and identify opportunities, as well as make informed decisions and measure aspects of their business, such as trust, that were difficult to quantify in the past.*

So the question, for those focused on their “assets”, those who manage them and everyone else, is **how do we get from here to there** without suffering undue hardship or distress?

## CBDC - Solving problems of the past or a Bridge?

The advent of CBDC comes with a raft of new regulations.

From the following example, we can see that regulation leads to consolidation. The implementation of the Financial Services Act 1986 in the UK, which came to be known as Big Bang, swept away the old self-regulatory structure of the UK Stock Exchange, The consolidation that rapidly followed, through the acquisition of most of the independent players, led to similar moves across all jurisdictions and the creation of “too big to fail” global banks and ultimately to the 2008 global financial crisis (GFC).

These global banks dominate the web of power, which extends into every aspect of financial services to ensure their interests are protected and served which is why, rather than a reset or Jubilee to address the 2008 crisis, with a few exceptions that were gobbled up by the remaining players, global banks were bailed out, as were most of the bond holders.

When we refer to the markets, we imagine that prices and indices reflect the accumulated thinking of many independent participants. The reality is different; statutory regulation has created systemic risks which didn’t exist under the previous self-regulatory regime.<sup>xvii</sup>

If CBDCs are introduced as per the current model to offset the volatility arising from commercial banks’ money creation or issuance, this will lead to more consolidation and even greater systemic risk.

CBDCs could form a bridge to the new data driven, direct value handling paradigm by implementing non-fungible tokenisation to capture, store and transfer in space and time, the unique attributes of assets and projects in parallel with the current exchange model. These tokens would act as a form of underwritten guarantee for current holders of assets by acting as exogenous, exchangeable money in the interim period until the new paradigm renders them unnecessary.

The Bank of International Settlements (BIS) itself, points to the role of CBDCs as public infrastructure. “.. CBDCs may help reduce the cost of payments by providing a *public infrastructure* for payments. ... *CBDC* designs” <sup>xviii</sup>

## From contemporary to the future

**Methodology:** Further adoption of Opensource style, co-creative methodologies. To effectively resolve problems, rather than focus on symptoms and their effects, we need to look at money and the associated methodologies themselves.

**Technical approach:** Standardisation to achieve Interoperability, Near line data storage and computation in distributed database structures, using software programs such as the blockchain; within an interconnected environment such as the InterPlanetary File System (IPFS)

## Conclusion

Optimal solutions to any problems tend to overwhelm ideological constructs. This paper describes how we may change the way we sustain ourselves, pointing to a future of inclusive human sustainability. The tools that can deliver are here; direct value handling already benefits large corporations that practice it. We are already contributing to the open model, with our data.

The open question is how do we individually, or as representatives of organisations, become beneficiary participants? The introduction of endogenous, non-fungible money enabling direct value handling of projects and assets provides a potential bridge solution. If underwritten as tradable tokens (CBDCs, as public infrastructure, are possible candidates) they can act as exogenous money until exchange is no longer required.

It is time for us as a species to face the music and part with the follies from the past.

Step 1 Get involved to comprehend “current” reality - adopt the emerging methodologies.

Step 2 explore, imagine, and select feasible possibilities from the ongoing Structural Change.

Step 3 become familiar with the tools, people, and resources available to deploy knowledge beneficial for human sustainability.

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